

Appl. No. 10/632,431

Attorney Docket : 42390.15449

Reply to Advisory Action

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REMARKS and ARGUMENTS

Applicants appreciate the Examiners attention to this application. Claims 1-37 are pending in the Application. All claims stand rejected under 35 U.S.C. § 103(a). A declaration under 37 C.F.R. § 1.131, which was previously submitted, is being re-submitted with this response to disqualify one of the references as prior art. This response provides further specificity regarding the previously-submitted Invention Disclosure Form in relation to the claimed subject matter.

Objections to Supplemental Declaration

The Office Action suggests that the declaration filed by Applicants on 19 May 2006 under 37 CFR 1.131 is ineffective to overcome the Damron reference. A Supplemental Declaration by registered patent attorney Shireen Bacon, as mentioned above, is being resubmitted herewith, providing evidence that the invention was conceived in the United States and Israel and providing further evidence of diligence. Applicants maintain that the original declaration along with the Supplemental Declaration is effective to overcome the Damron reference.

Place of Invention. The Supplemental Affidavit includes as an Exhibit a redacted copy of the Invention Disclosure Form. The Supplemental Affidavit asserts that this IDF form was submitted to the Intel legal department prior to the effective date of the Damron reference. The IDF form supplied in the Exhibit indicates that each of the inventors lives and works in either California or Israel. The evidence of this includes their residence addresses, the area codes of their phone numbers, and their Intel mail stops. This information is evidence that the inventors

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worked for Intel in this country or a NAFTA or WTO country, and is therefore evidence that the invention was conceived in this country or a NAFTA or WTO country.

Evidence of Conception. Applicants disagree with the Examiner's statement that the original "declaration does not specifically discuss the evidence relied upon and how it shows that the claimed invention was conceived prior to the Damron reference." The original Declaration specifically recites that the evidence they are relying upon to support that the claimed invention was conceived prior to the Damron reference is "shown by the Exhibit attached to this declaration."

Regarding the Examiner's assertion that Applicants "do not show details about how the evidence shows this", Applicants must strenuously disagree. In their Declaration, Applicants state that the Exhibit is an invention disclosure form submitted before the effective date. What more is needed to prove conception before the effective date than an invention disclosure document, which is the type of "demonstrative evidence" of "complete disclosure to another" requested by the Examiner, that shows, in complete detail, that the inventors were in possession of the invention prior to the effective date? Applicants respectfully request that the Examiner withdraw this portion of this objection to the Declaration, or else provide more specific guidance regarding what else he would require from Applicants in this regard.

Diligence. Regarding evidence of diligence, the Supplemental Affidavit of Shireen Bacon provides additional facts regarding diligence. It should be noted that critical period for diligence for a first conceiver but second reducer begins not at the time of conception of the first conceiver but just prior to the entry in the field of the party who was first to reduce to practice and continues until the first conceiver reduces to practice. *Hull v. Davenport*, 90 F.2d 103, 105, 33 USPQ 506, 508 (CCPA 1937) as cited in MPEP 2138.06. It should also be noted that

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does not require that "an inventor or his attorney drop all other work and concentrate on the particular invention involved.." *Emery v. Ronden*, 188 USPQ 264, 268 (Bd. Pat. Inter. 1974) as cited in MPEP 2138.06.

The critical period runs just before Damron entered the field by filing the patent application on January 28, 2003. The Declaration shows that reasonable diligence began before this date and continued until the application was filed on July 31, 2003. This period of time is approximately six months. This length of time is a reasonable amount of time in which to diligently draft a patent application. See, e.g., *Flex-Rest, LLC v. Steelcase, Inc.*, 455 F.3d 1351, 2006 U.S. App. LEXIS 17466 (Fed. Cir. 2006) (6.5 months to draft and file a patent application not unreasonable).

While Ms. Bacon did not drop all other work to concentrate on the current patent application, she did concentrate on, in due order, the drafting of a set of patent applications to which the current application was related, and in according with a well-reasoned strategy for the order in which the cases should be drafted. She also worked on the drafting and filing of other unrelated cases, in due order, that she had been assigned to write. This is sufficient evidence of diligence. See *Bey v. Kollonitsch*, 866 F.2d 1024, 231 USPQ 967 (Fed. Cir. 1986) (Reasonable diligence is all that is required of the attorney. Reasonable diligence is established if attorney worked reasonably hard on the application during the continuous critical period. If the attorney has a reasonable backlog of unrelated cases which he takes up in chronological order and carries out expeditiously, that is sufficient. Work on a related case(s) that contributed substantially to the ultimate preparation of an application can be credited as diligence.) as cited in MPEP 2138.06.

Thus, the original declaration submitted by the Applicants along with the Supplemental Declaration submitted herewith are sufficient to overcome the Damron reference.

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Applicants maintain that the original declaration along with the Supplemental Declaration is effective to overcome the Damron reference.

Evidence of Conception. In the Advisory Action, the Examiner requests that Applicants clearly show how the Invention Disclosure Form ("IDF") proves conception by showing where each claim can be found in the document. The discussion below shows, in complete detail, that the inventors were in possession of the claimed invention prior to the effective date. Although not exhaustive regarding every place in the IDF where each claim element is disclosed, the following discussion shows in sufficient detail at least one place in the IDF that conception of each claim element is disclosed.

Claim 1. In particular, the section entitled "1. Executive Summary" discloses first and second processors in the first figure of that section. In the second paragraph of such section, the Applicants demonstrate that they have possession of the conception of Speculative Precomputation, which involves a "main thread". It is obvious from this section that the main thread is a main thread instruction stream – for example, the section discloses that critical data are in the cache by the time they are "needed" (e.g., required as an input for an instruction in the main thread).

This discussion of Speculative Precomputation in the Executive Summary indicates a working knowledge of Speculative Precomputation, including a working knowledge that Speculative Precomputation involves "helper threads" that include a subset of the main thread instruction stream, where the subset includes the delinquent instruction. This implied knowledge is evidenced at the last paragraph of section 3.4. This paragraph refers to the helper thread, and

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how it is written to include the "delinquent loads of interest". See also Section 3, which states that "the helper threads are running prefetch slices, i.e., a subset of the main program." A "delinquent load" is understood, based on this implied knowledge of Speculative Precomputation, to be a load instruction that is predicted to miss in the cache.

The first figure in the Executive Summary discloses multiple processor cores with private caches (see second balloon from top on the left-hand side of the figure). The caches include private instruction caches (shown as "I" in the figure) and private data caches (shown as "D" in the figure).

The first figure in the Executive Summary further discloses a shared memory system — see "off-chip memory" and "on-chip Shared L3" in the figure. This shared memory is coupled to both the first and second processors (shown as shaded cores + private caches in the figure).

The second paragraph of the Executive Summary further discloses "helper-induced pre-fetches" to pre-fetch data into the cache.

The Executive Summary includes five numbered sub-paragraphs. In the first numbered sub-paragraph, it is disclosed that "when a miss from one core's cache is serviced by the shared cache." This is evidence of conception of "logic to retrieve, responsive to a miss of requested data for the delinquent instruction in the private cache of the second processor, the requested data from the shared memory system." (See Claim 1). Such sub-paragraph further states that "the data will be injected into all cores' private data caches." This statement is evidence of conception of "the logic to provide the requested data to the private data cache of the first processor." (See Claim 1).

Claim 2. First figure of the Executive Summary (see CMP chip package).

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Claim 3. The first figure in the Executive Summary “on-chip Shared L3”.

Claim 4. Executive Summary – “sharing occurs higher up in the hierarchy.” See also, Section 2: “but CMP models have private lower level caches and only share memory resources at higher levels of the memory hierarchy.” Use of the word “levels” in the plural form indicates more than one shared cache in the memory hierarchy.

Claim 5. First figure of the Executive summary, showing on-chip Shared L3 cache inside CMP chip package.

Claim 6. Section 3.1 – “when the higher level cache (such as shared L3) services a miss from one core’s lower level private cache (such as private L2), it broadcasts that result data return to all helper cores.”

Claim 7. First Figure of Executive Summary.

Claim 8. Section 3.1 – “when the higher level cache (such as shared L3) services a miss from one core’s lower level private cache (such as private L2), it broadcasts that result data return to all helper cores.”

Claim 9. Section 3.1 – return data from the cache is selectively multicast to a subset of the cores.

Claim 10. 4.3, subsection a – helper threads are spawned by main thread in response to triggers.

Claim 11. See sections above regarding first and second processors, main thread instruction stream, delinquent instruction, helper thread/subset of main thread instruction stream, first and second processors having private data caches. For the last two “logic” elements of Claim 11, please see section 3.2 of the IDF: when one core’s [private data cache] and then

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shared cache incurs a cache miss, the "other cores' private caches opportunistically return the requested data if they have it available."

Claim 12. Inherent in default cache hierarchy processing.

Claim 13. "interconnect network" in third numbered subparagraph of Executive Summary.

Claim 14. Section 3.1 -"Broadcasting..."

Claim 15. First figure of Executive Summary.

Claim 16. Executive Summary - "sharing occurs higher up in the hierarchy." See also, Section 2: "but CMP models have private lower level caches and only share memory resources at higher levels of the memory hierarchy." Use of the word "levels" in the plural form indicates more than one shared cache in the memory hierarchy.

Claim 17. 4.3, subsection a -- helper threads are spawned by main thread in response to triggers.

Claims 18 and 25. Executive Summary.

Claims 19 and 26. The Executive Summary includes five numbered sub-paragraphs. In the first numbered sub-paragraph, it is disclosed that "when a miss from one core's cache is serviced by the shared cache." This is evidence of conception of "retrieving the load data from a shared memory system." (See Claim 19). Such sub-paragraph further states that "the data will be injected into all cores' private data caches." This statement is evidence of conception of "providing the load data to the private cache of the main core." (See Claim 19). Evidence of conception of this latter element is also seen at the first numbered sub-paragraph of the

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Executive Summary, which states "helper thread prefetches to be realized much earlier in the main thread's core..."

Claims 20 and 27. First numbered sub-paragraph of Executive Summary. Such sub-paragraph further states that "the data will be injected into all cores' private data caches."

Claims 21 and 28. First numbered sub-paragraph of Executive Summary. Such sub-paragraph further states that "the data will be injected into all cores' private data caches."

Claims 22 and 29. Second numbered sub-paragraph of Executive Summary.

Claims 23 and 30. Section 3.1 -"Broadcasting..."

Claims 24 and 31. providing load data to main core from shared memory system – first numbered sub-paragraph of Executive Summary: "a miss from one core's cache is serviced by the shared cache." Providing load data to main core from the private cache of one of the plurality of cores – Section 3.2.

Claim 32. Executive Summary.

Claim 33. Executive Summary – "the helper threads will help the main thread to warm up the L3 cache."

Claim 34. Section 3.2.

Claim 35. Inherent in known cache processing.

Claim 36. Third numbered sub-paragraph of Executive Summary.

Claim 37. First figure of Executive Summary.

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In sum, Applicants have shown herein that the original declaration submitted by the Applicants along with the Supplemental Declaration submitted with the previous response by Applicants are sufficient to overcome the Damron reference.

Claim Rejections -35 USC § 103(a)

The Office Action has rejected Claims 1-3, 5-9, and 11-13, 15, 18-22 and 25-29 under 35 U.S.C. § 103(a) as being unpatentable over Damron (U.S. Patent Application Publication No. US 2004/0148491 A1) in view of Jamil (U.S. Patent Application Publication No. US 2003/0126365 A1). Although not specifically listed in paragraph 5 of the Office Action (the introductory paragraph for the Damron/Jamil rejections), it appears from the body of the Office Action that Claim 31 also stands rejected on these grounds (see text between paragraphs 20 and 21 of the Office Action).

The Office Action has also rejected Claims 4, 16, and 32-37 under 35 U.S.C. § 103(a) as being unpatentable over Damron in view of Jamil and in further view of Jeddeloh (U.S. Patent No. 6,789,168 B2). Finally, the Office Action also rejects Claims 10 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Damron in view of Jamil and in further view of Luk (U.S. Patent Application Publication No. US 2002/0055964 A1). However, the Office Action has failed to meet its burden of making a prima facie case of obviousness for the claims, and such rejections should be withdrawn.

The filing date of Damron is January 28, 2003 (the "Effective Date"). The present invention was conceived before that Effective Date. The Application was diligently drafted and filed during the time between just before the filing date of Damron until July 31, 2003.

Previously filed were an Original Declaration and also a Supplemental Declaration and

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associated evidence which provide additional facts concerning the conception and diligent constructive reduction to practice of the present invention.

In view of the foregoing, a prima facie case of obviousness has not been made with respect to any claim in the case. Since all of the rejections under 35 U.S.C. § 103(a) rely on Damron, to the extent that those rejections might be applied to the claims, those rejections should be withdrawn. All claims remaining in the case should therefore be allowed.

Accordingly, Applicants respectfully submit that the applicable rejections have been overcome and must all be withdrawn. Applicants reserve all rights with respect to the application of the doctrine equivalents. Applicant respectfully requests that a timely Notice of Allowance be issued in this case. If the Examiner feels that an interview would help to resolve any remaining issues in the case, the Examiner is invited to contact Shireen Bacon of Intel, at (512) 732-3917.

If there are any additional charges, please charge Deposit Account No. 50-0221. If a telephone interview would in any way expedite the prosecution of the present application, the Examiner is invited to contact David P. McAbee at (503) 712-4988.

Respectfully submitted,
Intel Corporation

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